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THE PROGRESS OF SCIENCE

*THE NEW YORK MEETING OF
THE AMERICAN ASSOCIATION
AND THE ORGANIZATION
OF SCIENCE*

THE forecast of the meeting of the American Association and the national scientific societies affiliated with it, printed just before the meeting in the last issue of this journal, was fulfilled in all respects. As had been anticipated, it was a meeting of unprecedented size, not only in this country, but, as far as we are aware, in any other country. The attendance can only be very roughly guessed, for while the association gives an opportunity for members to register, not nearly all of them do so, as the only practical advantage is the obtaining of a program. Some of the affiliated societies keep a register of members in attendance, but these have never been brought together for the whole meeting.

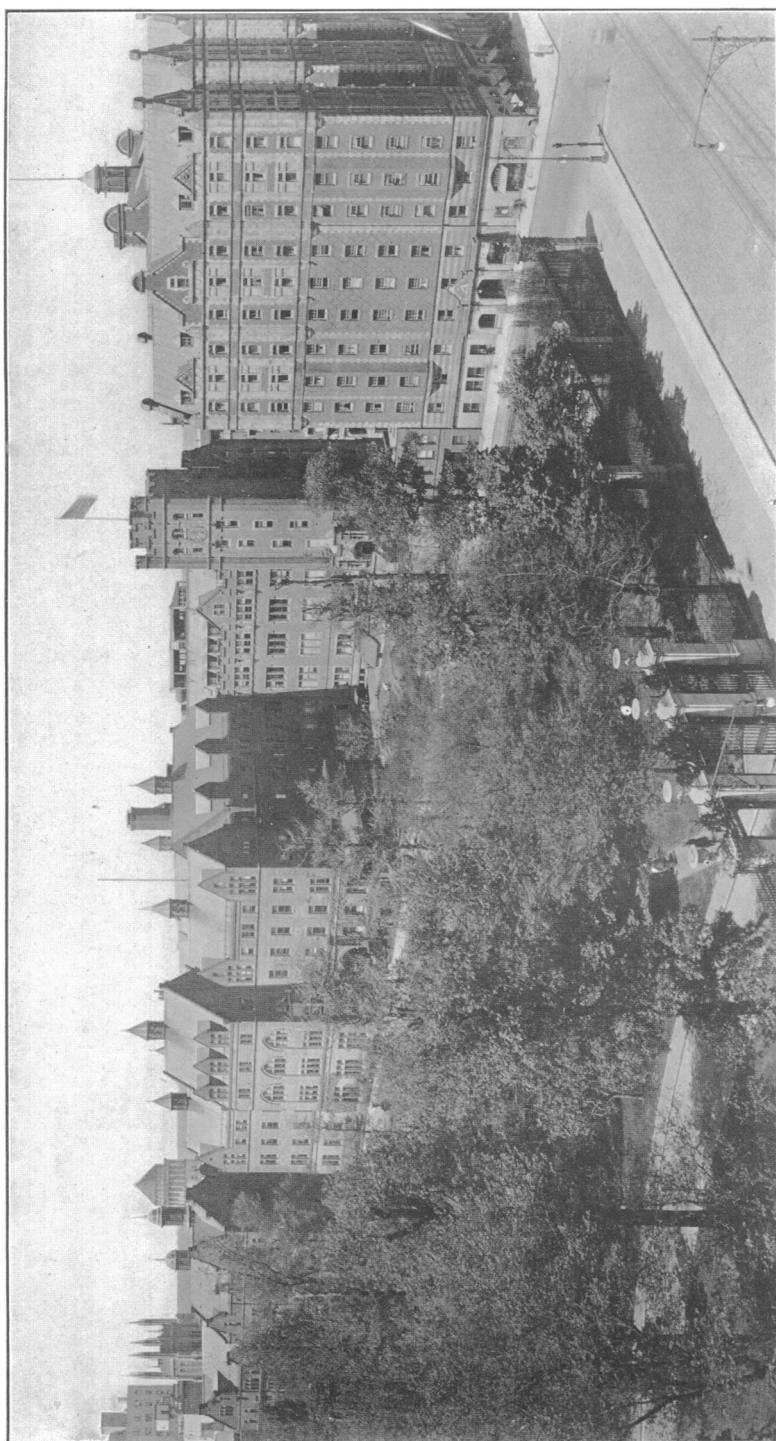
The magnitude of the meeting can be best realized from the number of separate organizations in session. Apart from the general session of the American Association and its twelve sections, there were fifty-two national scientific societies meeting during the week, and this number does not include the four national engineering societies and three associations devoted to highway engineering, which held meetings in connection with the section of engineering of the association, the metric conference, the meeting of the Committee of One Hundred on Scientific Research and various other organizations.

Altogether about seventy-five different organizations met during the week and, while there was a considerable amount of overlapping membership, the sessions appeared to be in all cases well attended. In spite of the large num-

ber of simultaneous meetings, there was no overcrowding. Six or eight thousand people naturally made small impression on the hotels of the city, which in that week are less crowded than in the preceding and following weeks. Columbia University has in attendance some 10,000 students every day and only part of the meetings were held there. Teachers College, part of the buildings of which are shown in the accompanying illustration, has, counting the students in the Horace Mann School, some 4,000 students in attendance.

The present situation in Europe has attracted universal attention to two factors—the importance of science and the necessity of effective organization—and these are combined in the American Association for the Advancement of Science, which represents the science of the nation, and a tolerably efficient organization of its twelve thousand members for the accomplishment of their objects. The advance in science and organization since the American Association was established in 1848 is truly remarkable. It covers a period from the time when American contributions to science were comparatively few to the present meeting, from which we can probably date the time at which America has assumed leadership in scientific research.

Local societies concerned with the whole field of knowledge had been established in the seventeenth century, the Philosophical Society of Philadelphia following the Royal Society of London, and the Academy of Arts and Sciences of Boston following the Paris Academy of Sciences. The National Academy of Sciences was organized in 1863, with a membership then limited to fifty. Until the establishment of the American Chemical Society in 1876,



THE BUILDING OF THE TEACHERS COLLEGE WITH THE CAMPUS OF COLUMBIA UNIVERSITY IN THE FOREGROUND.

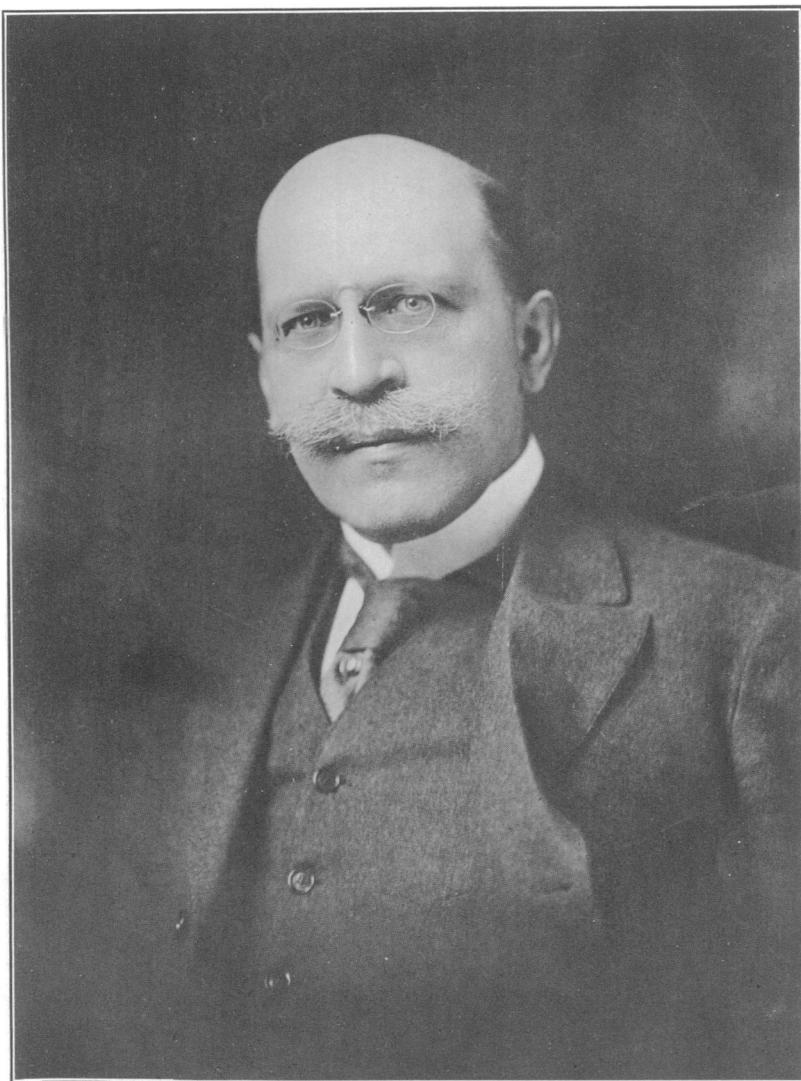
PROGRESS OF SCIENCE



ON THE COLUMBIA UNIVERSITY CAMPUS.

there were no special societies and the loosely organized American Association and the other societies mentioned were the only means of bringing together men in all the sciences then so little specialized that this was possible. In 1875, a formal division of the American Association was made into two sections, one for the exact and one for the natural sciences, and in 1882 nine sections were established. Parallel with the organization of scientific societies scientific journals were established, *The American Naturalist* in 1867, *The Pop-*

ular Science Monthly in 1872 and *Science* in 1883. The establishment of these general journals was followed by the establishment of special journals: the *Botanical Gazette* in 1876; the *American Journal of Mathematics* in 1878; the *American Chemical Journal*, the *American Journal of Morphology* and the *American Journal of Psychology* in 1877; the *American Geologist*, the *National Geographic Magazine* and the *American Anthropologist* in 1888, and so on, in increasing numbers to the present time. The Geological Society



HUGO MÜNSTERBERG.

The distinguished German Psychologist and Publicist, professor at Harvard University from 1892 until his sudden death on December 16.

of America and the present American Mathematical Society were organized in 1888, and in the intervening period have been established the large number of scientific societies which met together in New York during convocation week, and represented so impressively the development and differentiation of science in America.

*DR. CAMPBELL'S PRESIDENTIAL
ADDRESS ON THE NEBULÆ
BEFORE THE AMERICAN
ASSOCIATION*

THERE were printed on the official program of the association the titles of some fourteen hundred papers to be given at the meeting. Among this large number the address of the president of the association, Dr. W. W. Campbell, director of the Lick Observatory, may be selected for notice, not only owing to its official character, but also for its intrinsic interest. The discoveries of astronomy make a strong appeal to the imagination, and it is noteworthy that this least practical of all the sciences is the one which in America has been cultivated beyond all the others, so that the work of the great American observatories is not paralleled elsewhere.

Readers of this journal are familiar with Dr. Campbell's work on the evolution of stars and on comets through the admirable papers we have had the privilege of printing in recent numbers. His presidential address was on the nebulae, to which Sir William Herschel, towards the end of the eighteenth century, gave the first serious study. In 1845, it was determined by Lord Ross's reflecting telescope that some nebulae are of spiral structure, evidence that they are in rapid rotation. In 1864, William Huggins discovered that the spectra of certain nebulae prove that they are masses of gases, shining by their own light. The fourth event recorded by Dr. Campbell was the discovery by Keeler, beginning in 1898 at the Lick Observatory, that the great majority of nebulae are spirals and that the Crossley reflecting telescope that he

used could discover at least one hundred thousand nebulae in the sky.

Dr. Campbell explained—his clear exposition was throughout accompanied by striking and beautiful photographs—that of about fifteen thousand recorded nebulae not over three hundred, that is, not more than one fiftieth, are in the one quarter of the sky which contains the Milky Way, and these include nearly all the planetary and large gaseous nebulae. The other three quarters of the sky contains nearly fifteen thousand nebulae, not counting the scores of thousands as yet unrecorded. Thousands of spiral nebulae are known to exist, but not a single one has been found within the Milky Way.

Our stellar system is believed to occupy a limited volume of space, somewhat the shape of a very flat pocket watch, and we see the Milky Way as a bright band encircling the sky, because looking toward it we are looking out through the greatest depth of stars. There is reason to suspect that there is an immense amount of obstructing material in our system, that would be most effective in its long dimensions. If such obstructions are operating upon the light of extremely faint and distant nebulae, they should produce something like the distribution that is observed among the visible spiral nebulae.

The probable mass of certain spirals is stupendous, some of them appearing to contain enough material to make thousands, and possibly millions, of stars comparable in mass with our sun. The spectra of some spirals have the characteristics that we should expect to find if they consisted chiefly of multitudes of stars. If we carried our spectrograph so far out into space that looking back our stellar system would be reduced to the apparent size of the spiral nebulae, we should expect to see a spectrum similar to that yielded by the spirals. Dr. Campbell thus favors the hypothesis that the spiral nebulae are enormously distant bodies, independent stellar systems in different degrees of development, independent of our own stellar system.